Commonwealth of Kentucky
Division for Air Quality

PERMIT APPLICATION SUMMARY FORM

Completed by: Sukhendu K Majumdar

GENERAL INFORMATION:

Name:	Marathon Petroleum Company, LLC Catlettsburg Refining, LLC.
Address:	P.O. Box 1492 Catlettsburg, KY 41129
Date application received:	May 15, 2006
SIC/Source description:	2911
Source ID #:	21-019-00004
Source A.I. #:	339
Activity #:	APE20060005/20060008
Permit number:	V-05-089R1

APPLICATION TYPE/PERMIT ACTIVITY:

[ ] Initial issuance	[ ] General permit
[X] Permit modification	[ ]Conditional major
__Administrative	[X] Title V
__Minor	[X] Synthetic minor
X Significant	[ ] Operating
[ ] Permit renewal	[X] Construction/operating

COMPLIANCE SUMMARY:

[ ] Source is out of compliance [ ] Compliance schedule included

[X] Compliance certification signed

APPLICABLE REQUIREMENTS LIST:

[ ] NSR	[X] NSPS	[X] SIP
[ ] PSD	[X] NESHAPS	[ ] Other
[X] Netted out of PSD/NSR	[ ]	Not major modification per 401 KAR 51:001, 1(116)(b)

MISCELLANEOUS:

[ ] Acid rain source

[ ] Source subject to 112(r)

[X] Source applied for federally enforceable emissions cap

[X] Source provided terms for alternative operating scenarios

[X] Source subject to a MACT standard

[ ] Source requested case-by-case 112(g) or (j) determination

[ ] Application proposes new control technology

[X] Certified by responsible official

[X] Diagrams or drawings included

[ ] Confidential business information (CBI) submitted in application

[ ] Pollution Prevention Measures

[X] Area is non-attainment (list pollutants): Ozone (8- HR), PM 2.5

EMISSIONS SUMMARY:

Pollutant	2005 Actual (tpy)	Potential (tpy)
PM	134	1834.9
PM_{10}	134	1834.9
SO_2	2111	2230.6
NO_x	2512	3339.7
CO	1223	2551.7
VOC	2391	3499.2
Benzene	32.7	15.2
Cumene	18.3	40.8
Ethylbenzene	1.6	36.6
Methyl Tert-Butly Ether	unknown	324.0
Naphthalene	3.1	14.0
Toluene	9.1	47.4
Xylenes (Total)	3.8	11.0
Total HAPs	93	502.5

SOURCE DESCRIPTION:

A significant revision application for the installation of three (3) new package boilers at Catlettsburg Refining, LLC was received on May 15, 2006. As part of the project, seven (7) existing in-service older boilers will be removed and will be replaced with three (3) new large boilers. Each new boiler will have a maximum heat input capacity of 249.9 mmBtu/hr. This permit is the revision to proposed initial permit V-05-089, issued on March 30, 2007, to include the construction of the three (3) new boilers.

Marathon Petroleum Company at the Catlettsburg Refining, LLC (CRLLC) processes petroleum crude oil to produce gasoline, diesel fuel, kerosene, jet fuel and petroleum derivatives such as petrochemicals and lube oil feed stock. Besides the crude oil processing units, the refinery has boilers, sulfur plants, and waste water treatment. Raw crude, refined petroleum products, and intermediates are stored in the storage tanks for distribution and further processing.

The refinery at Catlettsburg uses the Big Sandy River to transport domestic crude oil and product distribution in barges. Besides the river transportation, there are railroad tank cars and truck loading and unloading facilities at different areas of the refinery used for efficient movement of transportation fuels, lube oil feed stock and petrochemicals. Viney Branch transfer racks are provided with a Vapor Recovery Unit (VRU) to absorb volatile organic compounds (VOC) in the activated carbon during loading operation. Activated carbon is regenerated by vacuum by using vacuum pump and the vapor is condensed to recover the hydrocarbon liquid. The vapor recovery system has an absorption and regeneration cycle. VOCs during solvent loading in the trucks and rail cars uses the Vapor Destruction Unit (VDU) to reduce the air emissions.

The light gases produced during the processing of the crude oil are used by the refinery sweet fuel gas system after being treated with amines. The refinery fuel gas is used for process heaters, steam generating boilers, flares and incinerators.

Amines are regenerated for recycling. Amine regenerator off-gas along with foul water stripper off-gas from the wastewater treatment area, are directed to the sulfur plant. The sulfur plant produces metallic sulfur in the Claus reactors and reduces the sulfur dioxide (SO2) emission from refinery. Some of the heaters and boilers at the refinery are provided with low nitrogen oxide (NO2) burners to reduce NOx emissions to the ambient air.

The refinery has one Fluidized Catalytic Cracking (FCC) unit, two Catalytic Cracking Reformer (CCR) units and one HF Alkylation unit to produce and improve the Research (RON) and Motor (MON) octane for the three grades of gasoline distributed in the pumps.

The CRLLC has a Lube Oil Complex to produce Lube Feed stock. Lube crude is processed in the #5 crude unit, and the lube vacuum unit makes the 100N and 325N waxy distillate. Waxy distillates are further treated in the Furfural Extraction unit and MEK De-waxing units to produce salable lube feed stock.

The CRLLC also manufactures petrochemicals such as cumene, solvents and other products to be further processed in the chemical industry. Some of the aromatics are also produced in the petrochemical area such as benzene, toluene, xylene, and naphthalene. The refinery brings in Coal Tar Light Oil (CTLO) from the coal industry to meet the demand of benzene in the manufacture of cumene. Light liquid from the reformers and distilled liquids from the CTLO are separated in the Sulfolane Unit liquid-liquid extraction process to produce benzene, toluene and xylene.

The refinery has two independent waste water systems: Oily water sewer system and NESHAP regulated waste water system. The NESHAP water is being collected in collection pits through out the refinery process units and pumped to a storage tank. Water from the storage tank before going to the common treatment facility is being treated in the Benzene Recovery Unit (BRU).

In the Title V initial operating permit, the refinery was broken down into nine areas based on the similarity of the process and state air regulations:

1. Transfer Racks: Loading/unloading raw materials and products;
2. Flares;
3. Cooling Towers;
4. Heaters, Boilers and Combustion Devices;
5. Process Units;
6. Storage Vessels;
7. General Wastewater Treatment Area
8. Benzene Wastewater Treatment Area
9. Remediation

EMISSION AND OPERATING CAPS DESCRIPTION:

The net emissions increase for any regulated New Source Review pollutant shall be less than the significant emissions increase level, as defined in 401 KAR 51:001, for 401 KAR 51:017, Prevention of Significant Deterioration, and 401 KAR 51:052, Review of New Sources, for the installation and operation of emission units B024, B025, and B026 [Permit V-05-089 R1].
The increase in potential emissions from the 3 boilers is below the significant emissions level of 40 tons per year for VOC. A netting analysis was performed for SO2, NOx, CO, and PM10 emissions. The total project increases for installation of the 3 boilers shall be equal to or less than the values indicated in the table below.

Emission Unit	Maximum Firing Rate (mmBtu/hr)	Emission Changes (tons/yr)				
		SO_2	NO_x	VOC	CO	PM_{10}
B024 (2-601-B-13)	249.9	29.6	38.3	5.9	43.8	8.2
B025 (2-601-B-14)	249.9	29.6	38.3	5.9	43.8	8.2
B026 (2-601-B-15)	249.9	29.6	38.3	5.9	43.8	8.2
Total Project Increases		88.8	114.9	17.7	131.4	24.6
Significant Level		40	40	40	100	15
Requires Netting		yes	yes	no	yes	yes

The existing boilers in the table below shall cease operation within sixty (60) days after achieving the maximum production rate from emission units B024, B025, and B026, but not later than 180 days after initial start-up of emission units B024, B025, and B026. The permittee shall conduct a performance demonstration (test) on the emission units B024, B025, and B026, in accordance with 401 KAR 50:055. The net emissions decrease was accomplished through netting analyses for each pollutant, in conjunction with emissions limits on each of the emission units that were modified in the Asset Development (Modernization) projects (earlier SO2 reductions).

Emission Unit	Maximum Firing Rate (mmBtu/hr)	Emission Changes (tons/yr)			
		SO_2	NO_x	CO	PM_{10}
B005 (2-601-B-5)	29.1	1.1	12.7	4.2	0.9
B015 (2-601-B-6)	36.9	0.9	16.2	13.3	1.2
B011 (1-9-B-7)	30.2	1.6	11.9	10.9	1.0
B012 (1-9-B-8)	23.8	2.1	9.4	8.6	0.8
B016 (2-601-B-10)	56.5	2.1	39.6	20.4	1.8
B023 (1-39-B-11)	52.3	1.6	38.9	18.8	1.7
B017 (2-601-B-12)	104.6	3.2	40.9	37.7	3.4

Total Project Decreases	12.6	169.6	113.9	10.8

Pursuant to 40 CFR 63.560(b)(2), in order to preclude the applicability of 40 CFR 63 Subpart Y Sections 63.562 (c) and (d), as referenced by 40 CFR 63 Subpart CC Section 63.651(a), the following loading limits shall not be exceeded at the marine tank vessel loading operations:

Product	**Loading Limit (million bbl/year)**
Gasoline	10
Crude Oil	200

Emissions due to loading materials at the Viney Branch transfer rack shall not exceed 120.9 tons of VOC during any consecutive 12-month period. [To preclude the applicability of 401 KAR 51:017, PSD, for VOC emissions]

Pursuant to 40 CFR 63.560(a)(2), in order to preclude the applicability of 40 CFR 63 Subpart Y Sections 63.562 (b) and (d), as referenced by 40 CFR 63 Subpart CC Section 63.651(a), the following emission limits shall not be exceeded at the marine tank vessel loading operations. Emissions shall be calculated using the methods specified in 40 CFR 63.565(l).

Pollutant	**Any consecutive 12-months period Emission Limit (ton/year)**
Each Individual HAP	10
All Combined HAP	25

VDU 1-7-B-1 shall control loading emissions from the New Solvent Truck Loading Rack (L004) with a VOC destruction efficiency of at least 98%. [To preclude the applicability of 401 KAR 51:017, PSD, for VOC emissions]

The use of chromium based water treatment chemicals is prohibited [Requirement to preclude applicability of 40 CFR 63, Subpart Q].

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3) and revised in V-05-089]

Affected Units	**Maximum Emissions (tons/yr)**				
	SO2	**NOx**	**VOC**	**CO**	**PM10**
H001 (1-002-B-003) No. 2 Crude Charge Heater	14.7	54.8	3.0	46.0	4.2

In addition, heat input to the No. 2 Crude Charge Heater shall not exceed 125.0 mmBtu/hr, HHV based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit S-96-207]

Affected Units	Maximum Emissions (tons/yr)
H014 (1-035-B-003) #1 Cumene Column Reboiler	Nitrogen oxides (NOx) emissions shall not equal or exceed 39 tons/yr

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3) and revised in V-05-089]

Affected Units	Maximum Emissions (tons/yr)				
	SO2	NOx	VOC	CO	PM10
H019 (2-026-B-002) No. 4 Vacuum Charge Heater	15.1	39.9	3.1	47.1	4.3
H020 (2-023-B-006) No. 4 Vacuum Charge Heater	18.8	97.8	3.8	58.7	5.3

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO2	NOx (consent limit)	VOC	CO	PM10
H021 (2-023-B-003) No. 3 Crude Charge Heater	20.8	54.3 (43.0)	4.65	65.2	5.9
H022 (2-023-B-004) No. 3 Crude Charge Heater	20.8	54.3 (43.0)	4.65	65.2	5.9

In addition, heat input to the No. 3 Crude Charge Heaters shall not exceed 177.1 mmBtu/hr, each, based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO2	NOx (consent limit)	VOC	CO	PM10
H023 (2-030-B-001) Sat Gas Plant Heater	21.0	54.6 (43.0)	4.3	65.6	5.9

In addition, heat input to the Sat Gas Plant Heater shall not exceed 178.2 mmBtu/hr HHV, based on

a 365-day rolling average.
The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO2	NOx	VOC	CO	PM10
H028 (2-036-B-001) HF Alky Isostripper Reboiler	11.1	41.4	2.3	34.8	3.1

In addition, heat input to the HF Alky Isostripper Reboiler shall not exceed 95 mmBtu/hr. Each of these limits is based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO2	NOx	VOC	CO	PM10
H029 (2-036-B-002) HF Alky Hot Oil Heater	2.3	8.7	0.5	7.3	0.7

In addition, heat input to the HF Alky Hot Oil Heater shall not exceed 20 mmBtu/hr HHV. Each of these limits is based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO2	NOx	VOC	CO	PM10
H034 (2-103-B-001) LPVGO Hydrotreater Charge Heater	5.8	21.7	1.2	18.2	1.6
H035 (2-103-B-002) LPVGO Hydrotreater Charge Heater	5.8	21.7	1.2	18.2	1.6
H036 (2-103-B-003) LPVGO Hydrotreater Stripper Heater	6.5	24.1	1.3	20.2	1.8

In addition, heat input to the LPVGO Hydrotreater Charge Heaters shall not exceed 50 mmBtu/hr HHV, each heater, and heat input to the LPVGO Hydrotreater Stripper Reboiler shall not exceed 55 mmBtu/hr HHV. Each of these limits is based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO2	NOx	VOC	CO	PM10
H037 (2-104-B-001) HPVGO Hydrotreater Charge Heater	11.7	23.8	2.4	36.4	3.3
H038 (2-104-B-002) HPVGO Hydrotreater Charge Heater	11.7	23.8	2.4	36.4	3.3

In addition, heat input to the HPVGO Hydrotreater Charge Heaters shall not exceed 99 mmBtu/hr HHV, each heater, based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit C-91-051 (Revision 3) and Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO2	NOx	VOC	CO	PM10
H043 (2-121-B-001) DDS Reactor Charge Heater	7.1	11.5	1.5	22.3	2.0
H044 (2-121-B-002) DDS Reactor Charge Heater	7.1	11.5	1.5	22.3	2.0
H045 (2-121-B-003) DDS Reactor Stripper Reboiler	11.0	17.8	2.3	34.4	3.1

In addition, heat input to the Distillate Desulfurizer Reactor Charge Heaters shall not exceed 61 mmBtu/hr, each heater, and heat input to the Distillate Desulfurizer Stripper Reboiler shall not exceed 94 mmBtu/hr HHV. Each of these limits is based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit C-92-033 (Revision 2)]

Affected Units	Maximum Emissions (tons/yr)
H046 (1-044-B-001) CCR #2 Charge Heater H047 (1-044-B-002) CCR #2 No. 1 Interheater H048 (1-044-B-003) CCR #2 No. 2 Interheater H049 (1-044-B-004) CCR #2 No. 3 Interheater H050 (1-044-B-005) CCR #2 Reboiler	Total nitrogen oxides (NOx) and sulfur dioxide (SOx) emissions shall not equal or exceed 39 tons/yr

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-04-001]

Affected Units	Maximum Emissions (tons/yr)				
	SO2	NOx	VOC	CO	PM10
H051 (2-122-B-001) KDS Charge Heater	6.30	11.7	1.3	19.6	1.8

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [VF-01-005].

Affected Units	Maximum Emissions (tons/yr)
	NOx
B014 (2-601-B-004) No. 4 Boiler	401

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [VF-02-001 (Revision 3)]

Affected Units	Maximum emissions (ton/yr)				
	SO2	NOx	VOC	CO	PM10
FCCU (including Heat Recovery Units North and South and Number 5 Package Boiler)	256.0	365.0	55.0	448.0	265.4

In addition, heat input to each of these heat recovery units shall not exceed 431 mmBtu/hr (HHV), based on a 365-day rolling average, and heat input to the Number 5, 13, 14, 15 Package Boilers shall not exceed 249 mmBtu/hr (HHV), based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [VF-02-001 (Revision 3)]

Affected Units	Maximum emissions (tons/yr)				
	SO2	NOx	VOC	CO	PM10
No. 1 SRU Thermal Oxidizer	323.0	25.0	1.4	21.0	2.0
No. 2 SRU Thermal Oxidizer					

In addition, sulfur production shall not exceed 628 long tons per day, based on a 365-day rolling average. Also, heat input to each thermal oxidizer shall not exceed 28.6 mmBtu/hr (HHV) based on 365-day rolling average. [State-only Requirements from VF-02-001 (Revision 3)]

Emission Unit	Refinery ID
T081	1-6-T-81
T152	1-6-T-152
T701	2-606-T-701
T702	2-606-T-702
T733	2-606-T-733

T734	2-606-T-734
T783	2-606-T-783
T821	2-606-T-821
T845	2-606-T-845
T855	2-606-T-855
T856	2-606-T-856
T910	2-606-T-910

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, Prevention of Significant Deterioration as follows: VOC emissions from the above storage vessels shall not exceed 51.9 tons per year, excluding emissions from equipment leaks, and based on a 12-month rolling sum, calculated monthly. [Permit VF-02-001 (Revision 3)]

Storage Tank # 911, 912, 913, and 920 were included in permit VF-02-001 (Revision 3) as part of a synthetic minor to avoid PSD for VOC, and were never constructed. The time limitation of construction have expired.

Pursuant to 40 CFR 63:021 (requirements from permit O-93-016 general condition 20), emissions of the following toxic air pollutants shall not exceed the limits listed below:

Cumene	57.1 lbs/hr	8 hour ave.
Xylene	97.2 lbs/hr	8 hour ave.
Toluene	58.9 lbs/hr	8 hour ave.
1,3 Butadiene	26.1 lbs/hr	8 hour ave.
Trimethylbenzene	156.4 lbs/hr	8 hour ave.
Naphthalene	69.4 lbs/hr	8 hour ave.
Methylene chloride	138.2 lbs/hr	8 hour ave.
Methyl ethyl ketone	720.8 lbs/hr	8 hour ave.
Nonane	306.6 lbs/hr	8 hour ave.
Methanol	37.3 lbs/hr	8 hour ave.
n-Hexane	235.4 lbs/hr	8 hour ave.
Furfural	1.8 lbs/hr	8 hour ave.
Chrysene	0.0059 lb/hr	BACT

OPERATIONAL FLEXIBILITY:

FCCU feed Hydro-treaters (HPVGO, LPVGO) Outage Plan:

Pursuant to the US EPA Consent Decree, during periods of hydro-treater outage, the permittee can elect to comply with the short-term SO_2 limits or alternatively with actions included in the approved Hydro-treater Outage Plan.

Pursuant to the US EPA Consent Decree, during periods of hydro-treater outage, the permittee can

elect to comply with the short-term NOx limits or alternatively with actions included in the approved Hydro-treater Outage Plan.

SRU Sulfur Shedding Plan:

Sulfur shedding plan will be followed as necessary when both SRU#1 and SRU#2 are inoperable. The plan shall be undertaken in the sequence necessary to achieve compliance as expeditiously as practicable.